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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/729,662	12/05/2003	David H. Shen		2755

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EXAMINER

VO, NGUYEN THANH

ART UNIT	PAPER NUMBER
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2618

DATE MAILED: 03/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/729,662

Applicant(s)

SHEN, DAVID H.

Examiner

Nguyen T. Vo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 December 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Drawings

1. Figures 1-2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claims 1-13 are objected to because of the following informalities: **in claim 1**, there must be only one period "."; therefore, the recitation "the first local oscillator. The output" at lines 13-14 should be changed to -- the first local oscillator, the output--; **in claim 13**, the recitation "there" should be changed to --there are--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to claim 1, the claim is indefinite because the preamble of the claim calls for a method claim, while the body of the claim has a structure of an apparatus claim. In order to overcome this rejection, it is suggested that the recitation "A method for a highly integrated radio receiver design comprising of" at lines 1-2 should be changed to –A highly integrated radio receiver comprising--. In addition, the recitation "the first local oscillator" at line 13 lacks clear antecedent basis because there is no "first local oscillator" being introduced before. In order to overcome this rejection, it is suggested that the recitation "the first local oscillator" at line 13 should be changed to –the first local frequency--.

As to claims 2-13, the recitation "The method" should be changed to –The receiver--.

As to claim 2, the recitation "the second local oscillator stage" lacks clear antecedent basis because there is no "second local oscillator stage" being introduced before.

As to claim 3, the word "replaced" renders the claim indefinite because it is conflict with claim 1.

As to claim 4, the recitation "the intermediate frequency filter stage" lacks clear antecedent basis because there is no "intermediate frequency filter stage" being introduced before.

As to claim 7, the recitation "the LNA" lacks clear antecedent basis because there is no "LNA" being introduced before. The recitation "the RF chip" lacks clear antecedent basis because there is no "RF chip" being introduced before.

As to claim 8, the recitation "the RF chip" lacks clear antecedent basis because there is no "RF chip" being introduced before.

As to claim 9, the recitation "the RF chip" lacks clear antecedent basis because there is no "RF chip" being introduced before. In addition, the recitation "the said image filters" should be changed to --the image filter--.

As to claim 12, the recitation "the receiver is implemented in **any** integrated circuit technology" render the claim indefinite because it is not clear as to what are being claimed.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-3, 5-6, 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Song (6,850,748, cited by examiner) in view of Cheng (6,763,230, cited by examiner).

As to claim 1, Song discloses in figure 4 a highly integrated radio receiver design (see column 2 lines 66-67) comprising of a low noise amplifier 403 (see figure 4) with an output connected to an image rejection filter 404, the output of the image rejection filter 404 connected to a mixer 405 whose second input is connected to a first local oscillator frequency (see the LO 408) and whose output is connected to an intermediate frequency amplifier stage 409 whose output is connected to a second mixer 413 with a

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second input connected to a second local oscillator frequency which is a frequency divided version of the first local oscillator (see the divider 411), the output of the second mixer is connected to a baseband low-pass filter for channel-select filtering (see numeral 415). See also column 4 line 56 to column 6 line 32. Song thus discloses all the claimed limitations except that the image rejection filter 404 has the ability to be tuned to track a variable intermediate frequency as recited in the claim. Cheng discloses an image rejection filter 14 (see figure 3) has the ability to be tuned to track a variable intermediate frequency (see column 2 lines 40-67). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the above teaching of Cheng to Song, in order to provide a receiver that can accurately filter signals and has strong abilities in rejecting images and nearby channel interferences (as suggested by Cheng at column 1 lines 38-41).

As to claim 2, the combination of Song and Cheng discloses the claimed limitations (see Song, figure 4, quadrature signals 415 and 416).

As to claim 3, the combination of Song and Cheng discloses the claimed limitations (see Song, column 5 lines 12-15).

As to claim 5, the combination of Song and Cheng fails to disclose that the second LO frequency is an integral divisor of the first LO frequency as claimed. Those skilled in the art, however, would have recognized that the above limitation would not render the claim patentable over the applied references, because it would merely depend on the operating frequency ranges of the receiver. In addition, the examiner takes Official Notice that using an integral divisor to obtain a second LO frequency from

a first LO frequency is known in the art. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Song and Cheng, in order to increase the operating frequency range of the receiver.

As to claim 6, the combination of Song and Cheng discloses that the second LO frequency is a fractional divisor of the first LO frequency as claimed (see Song, figure 4, fractional divisor $3/2$ in block 411).

As to claims 10-11, the combination of Song and Cheng does disclose that the receiver is implemented in an integrated circuit technology (see Song, column 2 lines 66-67), but fails to expressly disclose that the integrated circuit technology is CMOS technology as in claim 10, or bipolar technology as in claim 11. The examiner, however, takes Official Notice that such CMOS and bipolar technologies are known in the art. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Song and Cheng, in order to reduce implementing cost.

As to claim 12, the combination of Song and Cheng discloses the claimed limitations (see Song, column 2 lines 66-67).

7. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Song in view of Cheng as applied to claim 1 above, and further in view of Galal (6,161,004, cited by examiner).

As to claim 4, the combination of Song and Cheng fails to disclose that the IF filter stage 409 (see figure 4 in Song) is followed by an IF filter stage as claimed. Galal discloses in figure 3 a receiver wherein an IF filter stage 314 is followed by an IF filter

stage 306. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the above teaching of Galal to the combination of Song and Cheng, in order to eliminate unwanted signals (as suggested by Galal at column 4 lines 23-54).

8. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Song in view of Cheng as applied to claim 1 above, and further in view of Mostafa (US 2002/0181614, cited by examiner).

As to claims 7-8, the combination of Song and Cheng fails to disclose that the LNA 403 and filter 404 (see figure 4 in Song) are external components to the RF chip as claimed. Mostafa discloses that an LNA 90 and a filter 92 (see figure 7) are external components to the RF chip (see paragraph [0056]). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the above teaching of Mostafa to the combination of Song and Cheng, in order to reduce interference between electronic components in the receiver (as suggested by Mostafa at paragraph [0056]).

9. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Song in view of Cheng as applied to claim 1 above, and further in view of Copeland (6,542,724, cited by examiner).

As to claim 9, the combination of Song and Cheng fails to disclose that the image filter 404 (see figure 4 in Song) is integrated resonant element on the RF chip as claimed. Copeland discloses that an image filter is integrated resonant element on the RF chip (see column 2 lines 3-12). Therefore, it would have been obvious to one of

ordinary skill in the art at the time of the invention to provide the above teaching of Copeland to the combination of Song and Cheng, in order to reduce implementing cost and chip area (as suggested by Copeland at column 2 lines 3-12).

10. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Song in view of Cheng as applied to claim 1 above, and further in view of Abdelgany (6,584,090, cited by examiner).

As to claim 13, the combination of Song and Cheng does mention about multiband receivers (see Song, column 1 lines 21-23), but fails to expressly disclose a multiple front end comprising LNAs and image filters as claimed. Abdelgany disclose a multiple receiver (see figure 3) comprising a multiple front end comprising LNAs (see LNAs 90 and 166 in figure 3) and image filters (see the image filters 92 and 168 in figure 3). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the above teaching of Abdelgany to the combination of Song and Cheng, in order to provide a multiband receiver that has a minimum size, weight and low cost (as suggested by Abdelgany at column 2 lines 20-25).

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Baltus (6,282,413) and Carr (6,377,315) all disclose direct conversion receivers.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nguyen T. Vo whose telephone number is (571) 272-7901. The examiner can normally be reached on Monday-Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Urban can be reached on (571)272-7899. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Nguyen Vo

Nguyen Vo
3-14-2006

NGUYEN T. VO
PRIMARY EXAMINER